

RECEIVED  
AUG 01 2007  
TECH CENTER 1600/2900

2009



1600

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003

TIME: 11:32:12

Input Set : A:\5112b.app

Output Set: N:\CRF4\07292003\I915706B.raw

3 <110> APPLICANT: NELSON, DAVID R.  
5 <120> TITLE OF INVENTION: A LIVE, AVIRULENT STRAIN OF V. ANGUILLARUM THAT PROTECTS  
6 FISH AGAINST INFECTION BY VIRULENT V. ANGUILLARUM AND METHOD  
7 FOR MAKING THE SAME  
9 <130> FILE REFERENCE: 5112  
11 <140> CURRENT APPLICATION NUMBER: 09/915,706B  
C--> 12 <141> CURRENT FILING DATE: 2003-07-24  
14 <150> PRIOR APPLICATION NUMBER: 60/220,733  
15 <151> PRIOR FILING DATE: 2000-07-26  
17 <160> NUMBER OF SEQ ID NOS: 7  
19 <170> SOFTWARE: PatentIn Ver. 2.1  
21 <210> SEQ ID NO: 1  
22 <211> LENGTH: 3588  
23 <212> TYPE: DNA  
24 <213> ORGANISM: Vibrio anguillarum  
26 <220> FEATURE:  
27 <221> NAME/KEY: modified\_base  
28 <222> LOCATION: (3572)  
29 <223> OTHER INFORMATION: a, t, c, g, other or unknown  
31 <400> SEQUENCE: 1  
32 gtcgacttat tgcattgatg gcgtacatgg tagtgccatc cttcgttgc taacaagcgt 60  
33 tgtataaaaag cttggtcggt ttcatcaagt tgaacacaat actcatgatt tttcccaactt 120  
34 ccggaaaggg aaaagtgaaa atagctttg agatcagccct gttctagcag cttttcaatg 180  
35 atcttttcg tcgttacgtt ttgaaaaatc tgacgactgc gtttgtattt caacaagcta 240  
36 agtggatcca atatctctat ttgataataa aactgctgct tgtctttgct atatcctgtg 300  
37 aattgcagag tgctacatatac acctgaaaaaa aaacgccttc cagaatctaa ttctgtaaagac 360  
38 acacaaacag ctttacctag gttttggta tcgatctcca tggccgc gatggaaacg 420  
39 gaaaactgac acccgccgga tacgccttcc tctccgatta attgcgtgac aatataactt 480  
40 ttgctatctg aaagcttaat ggtgaggag cgggtttgggt gctttaattc ttactgctc 540  
41 atattcaatt aattcactat taaataaaaca gttctaaaag gctgtttattt ggatgaatat 600  
42 tcgaaattat cacataataa ttgatgctat tattacttgc tggatggta tcaactttca 660  
43 tgctctatac atgtaatata ttgcgttta gaccttaattt caaggttaattt tgtctattta 720  
44 attattatctt gaataatatg taatcgattt ctttgcgttattt atttttatgtt ttgtttcatt 780  
45 tttaatgacg gtggatctgtt gcattcatat tttttatgtt gacaacatctt ttgtatgaagt 840  
46 atttaagata ttgttaatgc atgaggggtt tgcgtgttattt ttttatattt aatcataata 900  
47 aaatcaacaa tatatgttattt ttgtgttctt tttatagttt tcttttaaaag aggttaggatg 960  
48 acctaaaggt cgccctaaataa tggcgtaaat tgccattgttataattcacc tcaaagatac 1020  
49 actattggca aattgacaaa tatgtcactt cgtatgaaac aatatttagta gatgttgc 1080  
50 ttgcgtcaaa aataaaaaattt tttctgggtt aaataactca aggcctctag cgttttcatt 1140  
51 tatcttaaaa tacaggaaat agcgattgaa gttaaattgac acttaagcaa atagtcaacc 1200  
52 taacagagca ggaacctatg ctttgcgttataa agcatcaat tgagcaactt tctaaacctc 1260  
53 tgagtgtatgtt ttcgtatgtt ggcgttatac tttaaactgga aaaaagtgtt tttcgccat 1320  
54 tacqtaatqaa attaatqtc qcqcaaactq cqctqcgtaa qctaagtcaa aacccttagtq 1380  
65 <400> SEQUENCE: 2  
66 <400> SEQUENCE: 3  
67 <400> SEQUENCE: 4  
68 <400> SEQUENCE: 5  
69 <400> SEQUENCE: 6  
70 <400> SEQUENCE: 7  
71 <400> SEQUENCE: 8  
72 <400> SEQUENCE: 9  
73 <400> SEQUENCE: 10  
74 <400> SEQUENCE: 11  
75 <400> SEQUENCE: 12  
76 <400> SEQUENCE: 13  
77 <400> SEQUENCE: 14  
78 <400> SEQUENCE: 15  
79 <400> SEQUENCE: 16  
80 <400> SEQUENCE: 17  
81 <400> SEQUENCE: 18  
82 <400> SEQUENCE: 19  
83 <400> SEQUENCE: 20  
84 <400> SEQUENCE: 21  
85 <400> SEQUENCE: 22  
86 <400> SEQUENCE: 23  
87 <400> SEQUENCE: 24  
88 <400> SEQUENCE: 25  
89 <400> SEQUENCE: 26  
90 <400> SEQUENCE: 27  
91 <400> SEQUENCE: 28  
92 <400> SEQUENCE: 29  
93 <400> SEQUENCE: 30  
94 <400> SEQUENCE: 31  
95 <400> SEQUENCE: 32  
96 <400> SEQUENCE: 33  
97 <400> SEQUENCE: 34  
98 <400> SEQUENCE: 35  
99 <400> SEQUENCE: 36  
100 <400> SEQUENCE: 37  
101 <400> SEQUENCE: 38  
102 <400> SEQUENCE: 39  
103 <400> SEQUENCE: 40  
104 <400> SEQUENCE: 41  
105 <400> SEQUENCE: 42  
106 <400> SEQUENCE: 43  
107 <400> SEQUENCE: 44  
108 <400> SEQUENCE: 45  
109 <400> SEQUENCE: 46  
110 <400> SEQUENCE: 47  
111 <400> SEQUENCE: 48  
112 <400> SEQUENCE: 49  
113 <400> SEQUENCE: 50  
114 <400> SEQUENCE: 51  
115 <400> SEQUENCE: 52  
116 <400> SEQUENCE: 53  
117 <400> SEQUENCE: 54  
118 <400> SEQUENCE: 55  
119 <400> SEQUENCE: 56  
120 <400> SEQUENCE: 57  
121 <400> SEQUENCE: 58  
122 <400> SEQUENCE: 59  
123 <400> SEQUENCE: 60  
124 <400> SEQUENCE: 61  
125 <400> SEQUENCE: 62  
126 <400> SEQUENCE: 63  
127 <400> SEQUENCE: 64  
128 <400> SEQUENCE: 65  
129 <400> SEQUENCE: 66  
130 <400> SEQUENCE: 67  
131 <400> SEQUENCE: 68  
132 <400> SEQUENCE: 69  
133 <400> SEQUENCE: 70  
134 <400> SEQUENCE: 71  
135 <400> SEQUENCE: 72  
136 <400> SEQUENCE: 73  
137 <400> SEQUENCE: 74  
138 <400> SEQUENCE: 75  
139 <400> SEQUENCE: 76  
140 <400> SEQUENCE: 77  
141 <400> SEQUENCE: 78  
142 <400> SEQUENCE: 79  
143 <400> SEQUENCE: 80  
144 <400> SEQUENCE: 81  
145 <400> SEQUENCE: 82  
146 <400> SEQUENCE: 83  
147 <400> SEQUENCE: 84  
148 <400> SEQUENCE: 85  
149 <400> SEQUENCE: 86  
150 <400> SEQUENCE: 87  
151 <400> SEQUENCE: 88  
152 <400> SEQUENCE: 89  
153 <400> SEQUENCE: 90  
154 <400> SEQUENCE: 91  
155 <400> SEQUENCE: 92  
156 <400> SEQUENCE: 93  
157 <400> SEQUENCE: 94  
158 <400> SEQUENCE: 95  
159 <400> SEQUENCE: 96  
160 <400> SEQUENCE: 97  
161 <400> SEQUENCE: 98  
162 <400> SEQUENCE: 99  
163 <400> SEQUENCE: 100  
164 <400> SEQUENCE: 101  
165 <400> SEQUENCE: 102  
166 <400> SEQUENCE: 103  
167 <400> SEQUENCE: 104  
168 <400> SEQUENCE: 105  
169 <400> SEQUENCE: 106  
170 <400> SEQUENCE: 107  
171 <400> SEQUENCE: 108  
172 <400> SEQUENCE: 109  
173 <400> SEQUENCE: 110  
174 <400> SEQUENCE: 111  
175 <400> SEQUENCE: 112  
176 <400> SEQUENCE: 113  
177 <400> SEQUENCE: 114  
178 <400> SEQUENCE: 115  
179 <400> SEQUENCE: 116  
180 <400> SEQUENCE: 117  
181 <400> SEQUENCE: 118  
182 <400> SEQUENCE: 119  
183 <400> SEQUENCE: 120  
184 <400> SEQUENCE: 121  
185 <400> SEQUENCE: 122  
186 <400> SEQUENCE: 123  
187 <400> SEQUENCE: 124  
188 <400> SEQUENCE: 125  
189 <400> SEQUENCE: 126  
190 <400> SEQUENCE: 127  
191 <400> SEQUENCE: 128  
192 <400> SEQUENCE: 129  
193 <400> SEQUENCE: 130  
194 <400> SEQUENCE: 131  
195 <400> SEQUENCE: 132  
196 <400> SEQUENCE: 133  
197 <400> SEQUENCE: 134  
198 <400> SEQUENCE: 135  
199 <400> SEQUENCE: 136  
200 <400> SEQUENCE: 137  
201 <400> SEQUENCE: 138  
202 <400> SEQUENCE: 139  
203 <400> SEQUENCE: 140  
204 <400> SEQUENCE: 141  
205 <400> SEQUENCE: 142  
206 <400> SEQUENCE: 143  
207 <400> SEQUENCE: 144  
208 <400> SEQUENCE: 145  
209 <400> SEQUENCE: 146  
210 <400> SEQUENCE: 147  
211 <400> SEQUENCE: 148  
212 <400> SEQUENCE: 149  
213 <400> SEQUENCE: 150  
214 <400> SEQUENCE: 151  
215 <400> SEQUENCE: 152  
216 <400> SEQUENCE: 153  
217 <400> SEQUENCE: 154  
218 <400> SEQUENCE: 155  
219 <400> SEQUENCE: 156  
220 <400> SEQUENCE: 157  
221 <400> SEQUENCE: 158  
222 <400> SEQUENCE: 159  
223 <400> SEQUENCE: 160  
224 <400> SEQUENCE: 161  
225 <400> SEQUENCE: 162  
226 <400> SEQUENCE: 163  
227 <400> SEQUENCE: 164  
228 <400> SEQUENCE: 165  
229 <400> SEQUENCE: 166  
230 <400> SEQUENCE: 167  
231 <400> SEQUENCE: 168  
232 <400> SEQUENCE: 169  
233 <400> SEQUENCE: 170  
234 <400> SEQUENCE: 171  
235 <400> SEQUENCE: 172  
236 <400> SEQUENCE: 173  
237 <400> SEQUENCE: 174  
238 <400> SEQUENCE: 175  
239 <400> SEQUENCE: 176  
240 <400> SEQUENCE: 177  
241 <400> SEQUENCE: 178  
242 <400> SEQUENCE: 179  
243 <400> SEQUENCE: 180  
244 <400> SEQUENCE: 181  
245 <400> SEQUENCE: 182  
246 <400> SEQUENCE: 183  
247 <400> SEQUENCE: 184  
248 <400> SEQUENCE: 185  
249 <400> SEQUENCE: 186  
250 <400> SEQUENCE: 187  
251 <400> SEQUENCE: 188  
252 <400> SEQUENCE: 189  
253 <400> SEQUENCE: 190  
254 <400> SEQUENCE: 191  
255 <400> SEQUENCE: 192  
256 <400> SEQUENCE: 193  
257 <400> SEQUENCE: 194  
258 <400> SEQUENCE: 195  
259 <400> SEQUENCE: 196  
260 <400> SEQUENCE: 197  
261 <400> SEQUENCE: 198  
262 <400> SEQUENCE: 199  
263 <400> SEQUENCE: 200  
264 <400> SEQUENCE: 201  
265 <400> SEQUENCE: 202  
266 <400> SEQUENCE: 203  
267 <400> SEQUENCE: 204  
268 <400> SEQUENCE: 205  
269 <400> SEQUENCE: 206  
270 <400> SEQUENCE: 207  
271 <400> SEQUENCE: 208  
272 <400> SEQUENCE: 209  
273 <400> SEQUENCE: 210  
274 <400> SEQUENCE: 211  
275 <400> SEQUENCE: 212  
276 <400> SEQUENCE: 213  
277 <400> SEQUENCE: 214  
278 <400> SEQUENCE: 215  
279 <400> SEQUENCE: 216  
280 <400> SEQUENCE: 217  
281 <400> SEQUENCE: 218  
282 <400> SEQUENCE: 219  
283 <400> SEQUENCE: 220  
284 <400> SEQUENCE: 221  
285 <400> SEQUENCE: 222  
286 <400> SEQUENCE: 223  
287 <400> SEQUENCE: 224  
288 <400> SEQUENCE: 225  
289 <400> SEQUENCE: 226  
290 <400> SEQUENCE: 227  
291 <400> SEQUENCE: 228  
292 <400> SEQUENCE: 229  
293 <400> SEQUENCE: 230  
294 <400> SEQUENCE: 231  
295 <400> SEQUENCE: 232  
296 <400> SEQUENCE: 233  
297 <400> SEQUENCE: 234  
298 <400> SEQUENCE: 235  
299 <400> SEQUENCE: 236  
300 <400> SEQUENCE: 237  
301 <400> SEQUENCE: 238  
302 <400> SEQUENCE: 239  
303 <400> SEQUENCE: 240  
304 <400> SEQUENCE: 241  
305 <400> SEQUENCE: 242  
306 <400> SEQUENCE: 243  
307 <400> SEQUENCE: 244  
308 <400> SEQUENCE: 245  
309 <400> SEQUENCE: 246  
310 <400> SEQUENCE: 247  
311 <400> SEQUENCE: 248  
312 <400> SEQUENCE: 249  
313 <400> SEQUENCE: 250  
314 <400> SEQUENCE: 251  
315 <400> SEQUENCE: 252  
316 <400> SEQUENCE: 253  
317 <400> SEQUENCE: 254  
318 <400> SEQUENCE: 255  
319 <400> SEQUENCE: 256  
320 <400> SEQUENCE: 257  
321 <400> SEQUENCE: 258  
322 <400> SEQUENCE: 259  
323 <400> SEQUENCE: 260  
324 <400> SEQUENCE: 261  
325 <400> SEQUENCE: 262  
326 <400> SEQUENCE: 263  
327 <400> SEQUENCE: 264  
328 <400> SEQUENCE: 265  
329 <400> SEQUENCE: 266  
330 <400> SEQUENCE: 267  
331 <400> SEQUENCE: 268  
332 <400> SEQUENCE: 269  
333 <400> SEQUENCE: 270  
334 <400> SEQUENCE: 271  
335 <400> SEQUENCE: 272  
336 <400> SEQUENCE: 273  
337 <400> SEQUENCE: 274  
338 <400> SEQUENCE: 275  
339 <400> SEQUENCE: 276  
340 <400> SEQUENCE: 277  
341 <400> SEQUENCE: 278  
342 <400> SEQUENCE: 279  
343 <400> SEQUENCE: 280  
344 <400> SEQUENCE: 281  
345 <400> SEQUENCE: 282  
346 <400> SEQUENCE: 283  
347 <400> SEQUENCE: 284  
348 <400> SEQUENCE: 285  
349 <400> SEQUENCE: 286  
350 <400> SEQUENCE: 287  
351 <400> SEQUENCE: 288  
352 <400> SEQUENCE: 289  
353 <400> SEQUENCE: 290  
354 <400> SEQUENCE: 291  
355 <400> SEQUENCE: 292  
356 <400> SEQUENCE: 293  
357 <400> SEQUENCE: 294  
358 <400> SEQUENCE: 295  
359 <400> SEQUENCE: 296  
360 <400> SEQUENCE: 297  
361 <400> SEQUENCE: 298  
362 <400> SEQUENCE: 299  
363 <400> SEQUENCE: 300  
364 <400> SEQUENCE: 301  
365 <400> SEQUENCE: 302  
366 <400> SEQUENCE: 303  
367 <400> SEQUENCE: 304  
368 <400> SEQUENCE: 305  
369 <400> SEQUENCE: 306  
370 <400> SEQUENCE: 307  
371 <400> SEQUENCE: 308  
372 <400> SEQUENCE: 309  
373 <400> SEQUENCE: 310  
374 <400> SEQUENCE: 311  
375 <400> SEQUENCE: 312  
376 <400> SEQUENCE: 313  
377 <400> SEQUENCE: 314  
378 <400> SEQUENCE: 315  
379 <400> SEQUENCE: 316  
380 <400> SEQUENCE: 317  
381 <400> SEQUENCE: 318  
382 <400> SEQUENCE: 319  
383 <400> SEQUENCE: 320  
384 <400> SEQUENCE: 321  
385 <400> SEQUENCE: 322  
386 <400> SEQUENCE: 323  
387 <400> SEQUENCE: 324  
388 <400> SEQUENCE: 325  
389 <400> SEQUENCE: 326  
390 <400> SEQUENCE: 327  
391 <400> SEQUENCE: 328  
392 <400> SEQUENCE: 329  
393 <400> SEQUENCE: 330  
394 <400> SEQUENCE: 331  
395 <400> SEQUENCE: 332  
396 <400> SEQUENCE: 333  
397 <400> SEQUENCE: 334  
398 <400> SEQUENCE: 335  
399 <400> SEQUENCE: 336  
400 <400> SEQUENCE: 337  
401 <400> SEQUENCE: 338  
402 <400> SEQUENCE: 339  
403 <400> SEQUENCE: 340  
404 <400> SEQUENCE: 341  
405 <400> SEQUENCE: 342  
406 <400> SEQUENCE: 343  
407 <400> SEQUENCE: 344  
408 <400> SEQUENCE: 345  
409 <400> SEQUENCE: 346  
410 <400> SEQUENCE: 347  
411 <400> SEQUENCE: 348  
412 <400> SEQUENCE: 349  
413 <400> SEQUENCE: 350  
414 <400> SEQUENCE: 351  
415 <400> SEQUENCE: 352  
416 <400> SEQUENCE: 353  
417 <400> SEQUENCE: 354  
418 <400> SEQUENCE: 355  
419 <400> SEQUENCE: 356  
420 <400> SEQUENCE: 357  
421 <400> SEQUENCE: 358  
422 <400> SEQUENCE: 359  
423 <400> SEQUENCE: 360  
424 <400> SEQUENCE: 361  
425 <400> SEQUENCE: 362  
426 <400> SEQUENCE: 363  
427 <400> SEQUENCE: 364  
428 <400> SEQUENCE: 365  
429 <400> SEQUENCE: 366  
430 <400> SEQUENCE: 367  
431 <400> SEQUENCE: 368  
432 <400> SEQUENCE: 369  
433 <400> SEQUENCE: 370  
434 <400> SEQUENCE: 371  
435 <400> SEQUENCE: 372  
436 <400> SEQUENCE: 373  
437 <400> SEQUENCE: 374  
438 <400> SEQUENCE: 375  
439 <400> SEQUENCE: 376  
440 <400> SEQUENCE: 377  
441 <400> SEQUENCE: 378  
442 <400> SEQUENCE: 379  
443 <400> SEQUENCE: 380  
444 <400> SEQUENCE: 381  
445 <400> SEQUENCE: 382  
446 <400> SEQUENCE: 383  
447 <400> SEQUENCE: 384  
448 <400> SEQUENCE: 385  
449 <400> SEQUENCE: 386  
450 <400> SEQUENCE: 387  
451 <400> SEQUENCE: 388  
452 <400> SEQUENCE: 389  
453 <400> SEQUENCE: 390  
454 <400> SEQUENCE: 391  
455 <400> SEQUENCE: 392  
456 <400> SEQUENCE: 393  
457 <400> SEQUENCE: 394  
458 <400> SEQUENCE: 395  
459 <400> SEQUENCE: 396  
460 <400> SEQUENCE: 397  
461 <400> SEQUENCE: 398  
462 <400> SEQUENCE: 399  
463 <400> SEQUENCE: 400  
464 <400> SEQUENCE: 401  
465 <400> SEQUENCE: 402  
466 <400> SEQUENCE: 403  
467 <400> SEQUENCE: 404  
468 <400> SEQUENCE: 405  
469 <400> SEQUENCE: 406  
470 <400> SEQUENCE: 407  
471 <400> SEQUENCE: 408  
472 <400> SEQUENCE: 409  
473 <400> SEQUENCE: 410  
474 <400> SEQUENCE: 411  
475 <400> SEQUENCE: 412  
476 <400> SEQUENCE: 413  
477 <400> SEQUENCE: 414  
478 <400> SEQUENCE: 415  
479 <400> SEQUENCE: 416  
480 <400> SEQUENCE: 417  
481 <400> SEQUENCE: 418  
482 <400> SEQUENCE: 419  
483 <400> SEQUENCE: 420  
484 <400> SEQUENCE: 421  
485 <400> SEQUENCE: 422  
486 <400> SEQUENCE: 423  
487 <400> SEQUENCE: 424  
488 <400> SEQUENCE: 425  
489 <400> SEQUENCE: 426  
490 <400> SEQUENCE: 427  
491 <400> SEQUENCE: 428  
492 <400> SEQUENCE: 429  
493 <400> SEQUENCE: 430  
494 <400> SEQUENCE: 431  
495 <400> SEQUENCE: 432  
496 <400> SEQUENCE: 433  
497 <400> SEQUENCE: 434  
498 <400> SEQUENCE: 435  
499 <400> SEQUENCE: 436  
500 <400> SEQUENCE: 437  
501 <400> SEQUENCE: 438  
502 <400> SEQUENCE: 439  
503 <400> SEQUENCE: 440  
504 <400> SEQUENCE: 441  
505 <400> SEQUENCE: 442  
506 <400> SEQUENCE: 443  
507 <400> SEQUENCE: 444  
508 <400> SEQUENCE: 445  
509 <400> SEQUENCE: 446  
510 <400> SEQUENCE: 447  
511 <400> SEQUENCE: 448  
512 <400> SEQUENCE: 449  
513 <400> SEQUENCE: 450  
514 <400> SEQUENCE: 451  
515 <400> SEQUENCE: 452  
516 <400> SEQUENCE: 453  
517 <400> SEQUENCE: 454  
518 <400> SEQUENCE: 455  
519 <400> SEQUENCE: 456  
520 <400> SEQUENCE: 457  
521 <400> SEQUENCE: 458  
522 <400> SEQUENCE: 459  
523 <400> SEQUENCE: 460  
524 <400> SEQUENCE: 461  
525 <400> SEQUENCE: 462  
526 <400> SEQUENCE: 463  
527 <400> SEQUENCE: 464  
528 <400> SEQUENCE: 465  
529 <400> SEQUENCE: 466  
530 <400> SEQUENCE: 467  
531 <400> SEQUENCE: 468  
532 <400> SEQUENCE: 469  
533 <400> SEQUENCE: 470  
534 <400> SEQUENCE: 471  
535 <400> SEQUENCE: 472  
536 <400> SEQUENCE: 473  
537 <400> SEQUENCE: 474  
538 <400> SEQUENCE: 475  
539 <400> SEQUENCE: 476  
540 <400> SEQUENCE: 477  
541 <400> SEQUENCE: 478  
542 <400> SEQUENCE: 479  
543 <400> SEQUENCE: 480  
544 <400> SEQUENCE: 481  
545 <400> SEQUENCE: 482  
546 <400> SEQUENCE: 483  
547 <400> SEQUENCE: 484  
548 <400> SEQUENCE: 485  
549 <400> SEQUENCE: 486  
550 <400> SEQUENCE: 487  
551 <400> SEQUENCE: 488  
552 <400> SEQUENCE: 489  
553 <400> SEQUENCE: 490  
554 <400> SEQUENCE: 491  
555 <400> SEQUENCE: 492  
556 <400> SEQUENCE: 493  
557 <400> SEQUENCE: 494  
558 <400> SEQUENCE: 495  
559 <400> SEQUENCE: 496  
560 <400> SEQUENCE: 497  
561 <400> SEQUENCE: 498  
562 <400> SEQUENCE: 499  
563 <400> SEQUENCE: 500  
564 <400> SEQUENCE: 501  
565 <400> SEQUENCE: 502  
566 <400> SEQUENCE: 503  
567 <400> SEQUENCE: 504  
568 <400> SEQUENCE: 505  
569 <400> SEQUENCE: 506  
570 <400> SEQUENCE: 507  
571 <400> SEQUENCE: 508  
572 <400> SEQUENCE: 509  
573 <400> SEQUENCE: 510  
574 <400> SEQUENCE: 511  
575 <400> SEQUENCE: 512  
576 <400> SEQUENCE: 513  
577 <400> SEQUENCE: 514  
578 <400> SEQUENCE: 515  
579 <400> SEQUENCE: 516  
580 <400> SEQUENCE: 517  
581 <400> SEQUENCE: 518  
582 <400> SEQUENCE: 519  
583 <400> SEQUENCE: 520  
584 <400> SEQUENCE: 521  
585 <400> SEQUENCE: 522  
586 <400> SEQUENCE: 523  
587 <400> SEQUENCE: 524  
588 <400> SEQUENCE: 525  
589 <400> SEQUENCE: 526  
590 <400> SEQUENCE: 527  
591 <400> SEQUENCE: 528  
592 <400> SEQUENCE: 529  
593 <400> SEQUENCE: 530  
594 <400> SEQUENCE: 531  
595 <400> SEQUENCE: 532  
596 <400> SEQUENCE: 533  
597 <400> SEQUENCE: 534  
598 <400> SEQUENCE: 535  
599 <400> SEQUENCE: 536  
600 <400> SEQUENCE: 537  
601 <400> SEQUENCE: 538  
602 <400> SEQUENCE: 539  
603 <400> SEQUENCE: 540  
604 <400> SEQUENCE: 541  
605 <400> SEQUENCE: 542  
606 <400> SEQUENCE: 543  
607 <400> SEQUENCE: 544  
608 <400> SEQUENCE: 545  
609 <400> SEQUENCE: 546  
610 <400> SEQUENCE: 547  
611 <400> SEQUENCE: 548  
612 <400> SEQUENCE: 549  
613 <400> SEQUENCE: 550  
614 <400> SEQUENCE: 551  
615 <400> SEQUENCE: 552  
616 <400> SEQUENCE: 553  
617 <400> SEQUENCE: 554  
618 <400> SEQUENCE: 555  
619 <400> SEQUENCE: 556  
620 <400> SEQUENCE: 557  
621 <400> SEQUENCE: 558  
62

ENTERED

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003

TIME: 11:32:12

Input Set : A:\5112b.app

Output Set: N:\CRF4\07292003\I915706B.raw

55 ctgacgagag agatgcgtta caagaggcat gtctaaataa gtggaagatt ctctctgaca 1440  
 56 gtttgcgtca acagtttca aaaacaacca gagatatcga gtcatctca tggttgg 1500  
 57 ctgctcaatt cttctcgat accacattag aaagtgcgtc gaatagccgt gagggttag 1560  
 58 cggtttaag tgagaagcac tggatcacc tcaaccctgt actaccaggtaa gaaacgctca 1620  
 59 aatctgtga tgataaggc aaagaaagag agcaagcaga tgcgaaaggtaa aacatttt 1680  
 60 tccaactagt cggcgatagc gaggaaagct cgattctcta tgcgcccgtc ctgcaactgc 1740  
 61 ctttagtcgg ggaagtgcgtt tttttgact ttcaaagtgc agagagaaaa ggcgaaatca 1800  
 62 gccaactgaa atctatgctt acgaccacgg tggcgcaaga gcttcgca attcaattca 1860  
 63 agatggaaaa cgcacaaacgt tggatcacc aatttagatcg tttgtcagcg ttggtagca 1920  
 64 ctaagtgtca ttctcttaggc agtcaaaggta ccaacttcgg atttgcgaag tcactgctta 1980  
 65 cccgtgttga aaacgcctt gttcatctaa gtggaaattaa gttagcaccg aaagcggagg 2040  
 66 ccaagacagt agagcaagag gttgcccggaa gttcgtttc tgaaggggag ctgccaagcc 2100  
 67 atatggatac aaaacatata gacgaaatac cgatggcatc agagcaggct cagaccgtaa 2160  
 68 gccaacactt acacgcagga aacctctctg aactggtaa tttaaacaat atgaaccgag 2220  
 69 acttagctt ccatttttgc agagaagtct ctgattttt tcgcccggagc gaaccgcata 2280  
 70 gccaatttc atttttgtt gaaaaagcga ttgcgtggg atatttatcc ttacctgagt 2340  
 71 tgctgcgaga aatgtgtcg gaacaaaacg gtgcgtctt tagtacgatt ttatgcgc 2400  
 72 cggattgaa tcatctcgat cagggtttgc tggcgaggt ggtactcca acgggtggca 2460  
 73 ttgaaagccc ccaaaccactt caagcgaagc cttccgttgc gatccgcgaa agtggtaag 2520  
 74 agcatgttac tcagacttcc cctgttagata ccaatctaa gcaagatcaa aaaccacaaat 2580  
 75 catccgctac gtcggctctg agtggtaat tggatggaaat aaataaggaa aaatcatggc 2640  
 76 aagtatttac atgcgtgtaa gcggttttca agttggggc gcagcgcacta tcggcgtact 2700  
 77 agaaaacggct gaaggtaaaa atgcgtttg gtttgcatac aactcttact cttgggggtgg 2760  
 78 cgctcgtaac gttgctatgg acatcggtaa cggcaccaat gcccgttgc gatgggtgg 2820  
 79 cgtaaaggcgtt gttagcgtaa ctaaagaagt cgatgggtct tctgaagacc tactgtctta 2880  
 80 ttatttcaac ccaggtaaag acggtaaaac tggtaggtt gcatattacta agccttctaa 2940  
 81 cgatggtaa ggtgcagacg ttacttcca agttaagcta gaaaaagcac gtttagttc 3000  
 82 ttacaacgtg agcgggactg acggatctca accgtacgag acctatctc ttttttacac 3060  
 83 ttctatttct cagaagcattc actatgagaa agaagggtgtt gactacaaa gcggtgggtgt 3120  
 84 tggacttac gacccatcgat cccggaaaat gacttctgtt aacttactt ttcatttagac 3180  
 85 atgccacgtt aattggcatg ttatattcat gaatatctca ttttaggaca ccgttatggc 3240  
 86 atggactca caacataaggc ggttagtaa gacccgtgtc agcatcacct atgacgttga 3300  
 87 aacgaatggc gccgtaaaga cggaaagagct gccgtttgtt gttggcgtca ttggcgactt 3360  
 88 ttccggacac aaaccacaaat cagaaaaaggtaa tgatttagaa gagcggaggt tcacgggtat 3420  
 89 cgataaaggac aacttcgata cagtgtatgg gcaattcac ccgcgtctt cgtacaagg 3480  
 90 tgataacaag cttgtataatg atgatagccaa gtttgaagtg aacttggggcc tccgttcgtat 3540  
 91 gaaagatttc cacccacacaa acttagttgtaa tnaaatttagtcccgcttaa 3588

W--> 91 gaaagatttc cacccacacaa acttagttgtaa tnaaatttagtcccgcttaa 3588  
 94 <210> SEQ ID NO: 2

95 <211> LENGTH: 463

96 <212> TYPE: PRT

97 <213> ORGANISM: Vibrio anguillarum

99 <400> SEQUENCE: 2

100 Met Pro Leu Ser Lys His Gln Ile Glu Gln Leu Ser Lys Pro Leu Ser

101 1 5 10 15

103 Asp Asp Ser Ile Cys Gly Val Tyr Leu Lys Leu Glu Lys Ser Ala Phe

104 20 25 30

106 Arg Pro Leu Arg Asn Glu Phe Asn Val Ala Gln Thr Ala Leu Arg Lys

107 35 40 45

109 Leu Ser Gln Asn Pro Ser Ala Asp Glu Arg Asp Ala Leu Gln Glu Ala

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003

TIME: 11:32:12

Input Set : A:\5112b.app

Output Set: N:\CRF4\07292003\I915706B.raw

110	50	55	60													
112	Cys	Leu	Asn	Lys	Trp	Lys	Ile	Leu	Ser	Asp	Ser	Leu	Tyr	Glu	Gln	Phe
113	65					70						75				80
115	Ser	Lys	Thr	Thr	Arg	Asp	Ile	Glu	Leu	Ile	Ser	Trp	Phe	Val	Ala	Ala
116						85					90				95	
118	Gln	Phe	Leu	Leu	Asp	Thr	Thr	Leu	Glu	Ser	Ala	Ala	Asn	Ser	Leu	Glu
119						100			105				110			
121	Trp	Leu	Ala	Asp	Leu	Ser	Glu	Lys	His	Trp	Asp	His	Leu	Asn	Pro	Val
122						115			120			125				
124	Leu	Pro	Val	Glu	Thr	Leu	Lys	Ser	Asp	Asp	Asp	Lys	Gly	Lys	Glu	Arg
125						130			135			140				
127	Glu	Gln	Ala	Asp	Ala	Lys	Val	Lys	Ala	Phe	Phe	Gln	Leu	Val	Gly	Asp
128	145					150			155			160				
130	Ser	Glu	Glu	Ser	Ser	Ile	Leu	Tyr	Ala	Pro	Val	Leu	Gln	Leu	Pro	Leu
131						165			170			175				
133	Val	Gly	Glu	Val	Thr	Phe	Phe	Asp	Phe	Gln	Ser	Ala	Glu	Arg	Lys	Gly
134						180			185			190				
136	Glu	Ile	Ser	Gln	Leu	Lys	Ser	Met	Leu	Thr	Thr	Val	Ala	Gln	Glu	
137						195			200			205				
139	Arg	Phe	Ala	Ile	Gln	Phe	Lys	Met	Glu	Asn	Ala	Lys	Arg	Cys	Val	Thr
140						210			215			220				
142	Gln	Leu	Asp	Arg	Leu	Ser	Ala	Leu	Val	Ser	Thr	Lys	Cys	His	Ser	Leu
143						225			230			235			240	
145	Gly	Ser	Gln	Ser	Thr	Asn	Phe	Gly	Phe	Ala	Lys	Ser	Leu	Leu	Thr	Arg
146						245			250			255				
148	Val	Glu	Asn	Ala	Leu	Val	His	Leu	Ser	Gly	Ile	Lys	Leu	Ala	Pro	Lys
149						260			265			270				
151	Ala	Glu	Ala	Lys	Thr	Val	Glu	Gln	Glu	Val	Ala	Glu	Ser	Ser	Val	Ser
152						275			280			285				
154	Glu	Gly	Glu	Leu	Pro	Ser	His	Met	Asp	Thr	Lys	His	Ile	Glu	Arg	Ile
155						290			295			300				
157	Pro	Met	Ala	Ser	Glu	Gln	Ala	Gln	Thr	Val	Ser	Gln	His	Leu	His	Ala
158						305			310			315			320	
160	Gly	Asn	Leu	Ser	Glu	Leu	Gly	Asn	Leu	Asn	Asn	Met	Asn	Arg	Asp	Leu
161						325			330			335				
163	Ala	Phe	His	Leu	Leu	Arg	Glu	Val	Ser	Asp	Tyr	Phe	Arg	Gln	Ser	Glu
164						340			345			350				
166	Pro	His	Ser	Pro	Ile	Ser	Phe	Leu	Leu	Glu	Lys	Ala	Ile	Arg	Trp	Gly
167						355			360			365				
169	Tyr	Leu	Ser	Leu	Pro	Glu	Leu	Leu	Arg	Glu	Met	Met	Ser	Glu	Gln	Asn
170						370			375			380				
172	Gly	Asp	Ala	Leu	Ser	Thr	Ile	Phe	Asn	Ala	Ala	Gly	Leu	Asn	His	Léu
173						385			390			395			400	
175	Asp	Gln	Val	Leu	Leu	Pro	Glu	Val	Ser	Thr	Pro	Thr	Val	Gly	Ile	Glu
176						405			410			415				
178	Ser	Pro	Gln	Thr	Pro	Gln	Ala	Lys	Pro	Ser	Val	Ser	Asp	Pro	Arg	Ser
179						420			425			430				
181	Val	Glu	Glu	His	Val	Ser	Gln	Thr	Ser	Pro	Val	Asp	Thr	Gln	Ser	Lys
182						435			440			445				

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003

TIME: 11:32:12

Input Set : A:\5112b.app

Output Set: N:\CRF4\07292003\I915706B.raw

184 Gln Asp Gln Lys Pro Gln Ser Ser Ala Thr Ser Ala Leu Ser Trp  
 185 450 455 460  
 188 <210> SEQ ID NO: 3  
 189 <211> LENGTH: 176  
 190 <212> TYPE: PRT  
 191 <213> ORGANISM: *Vibrio anguillarum*  
 193 <400> SEQUENCE: 3  
 194 Met Ala Ser Ile Tyr Met Arg Val Ser Gly Leu Gln Val Glu Gly Ala  
 195 1 5 10 15  
 197 Ala Thr Ile Gly Gln Leu Glu Thr Ala Glu Gly Lys Asn Asp Gly Trp  
 198 20 25 30  
 200 Phe Ala Ile Asn Ser Tyr Ser Trp Gly Gly Ala Arg Asn Val Ala Met  
 201 35 40 45  
 203 Asp Ile Gly Asn Gly Thr Asn Ala Asp Ser Gly Met Val Gly Val Ser  
 204 50 55 60  
 206 Glu Val Ser Val Thr Lys Glu Val Asp Gly Ala Ser Glu Asp Leu Leu  
 207 65 70 75 80  
 209 Ser Tyr Leu Phe Asn Pro Gly Lys Asp Gly Lys Thr Val Glu Val Ala  
 210 85 90 95  
 212 Phe Thr Lys Pro Ser Asn Asp Gly Gln Gly Ala Asp Val Tyr Phe Gln  
 213 100 105 110  
 215 Val Lys Leu Glu Lys Ala Arg Leu Val Ser Tyr Asn Val Ser Gly Thr  
 216 115 120 125  
 218 Asp Gly Ser Gln Pro Tyr Glu Ser Leu Ser Leu Ser Tyr Thr Ser Ile  
 219 130 135 140  
 221 Ser Gln Lys His His Tyr Glu Lys Glu Gly Gly Glu Leu Gln Ser Gly  
 222 145 150 155 160  
 224 Gly Val Val Thr Tyr Asp Leu Pro Thr Gly Lys Met Thr Ser Gly Lys  
 225 165 170 175  
 227 <210> SEQ ID NO: 4  
 228 <211> LENGTH: 117  
 229 <212> TYPE: PRT  
 230 <213> ORGANISM: *Vibrio anguillarum*  
 232 <220> FEATURE:  
 233 <221> NAME/KEY: MOD\_RES  
 234 <222> LOCATION: (113)  
 235 <223> OTHER INFORMATION: Variable amino acid  
 237 <400> SEQUENCE: 4  
 238 Met Ala Leu Asn Ser Gln His Lys Arg Val Ser Lys Asn Arg Val Ser  
 239 1 5 10 15  
 241 Ile Thr Tyr Asp Val Glu Thr Asn Gly Ala Val Lys Thr Lys Glu Leu  
 242 20 25 30  
 244 Pro Phe Val Val Gly Val Ile Gly Asp Phe Ser Gly His Lys Pro Glu  
 245 35 40 45  
 247 Ser Glu Lys Val Asp Leu Glu Glu Arg Glu Phe Thr Gly Ile Asp Lys  
 248 50 55 60  
 250 Asp Asn Phe Asp Thr Val Met Gly Gln Ile His Pro Arg Leu Ser Tyr  
 251 65 70 75 80  
 253 Lys Val Asp Asn Lys Leu Ala Asn Asp Ser Gln Phe Glu Val Asn

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003

TIME: 11:32:12

Input Set : A:\5112b.app

Output Set: N:\CRF4\07292003\I915706B.raw

254 85 90 95  
256 Leu Ser Leu Arg Ser Met Lys Asp Phe His Pro Glu Asn Leu Val Asp  
257 100 105 110  
W--> 259 Xaa Ile Glu Pro Leu  
260 115  
263 <210> SEQ ID NO: 5  
264 <211> LENGTH: 31  
265 <212> TYPE: DNA  
266 <213> ORGANISM: Artificial Sequence  
268 <220> FEATURE:  
269 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer  
271 <400> SEQUENCE: 5  
272 tttctgcagc tggttgaaat aactcaaggc c 31  
275 <210> SEQ ID NO: 6  
276 <211> LENGTH: 32  
277 <212> TYPE: DNA  
278 <213> ORGANISM: Artificial Sequence  
280 <220> FEATURE:  
281 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer  
283 <400> SEQUENCE: 6  
284 tttctgcagg gatccgaaac ggaaggcttc gc 32  
287 <210> SEQ ID NO: 7  
288 <211> LENGTH: 29  
289 <212> TYPE: DNA  
290 <213> ORGANISM: Artificial Sequence  
292 <220> FEATURE:  
293 <223> OTHER INFORMATION: Description of Artificial Sequence: Primer  
295 <400> SEQUENCE: 7  
296 tttaagcttc acgcatgtaa atacttgcc 29

RAW SEQUENCE LISTING ERROR SUMMARY  
PATENT APPLICATION: US/09/915,706B

DATE: 07/29/2003  
TIME: 11:32:13

Input Set : A:\5112b.app  
Output Set: N:\CRF4\07292003\I915706B.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:1; N Pos. 3572  
Seq#:4; Xaa Pos. 113